APPENDIX B

Pound Place
Roundstone Lane
Angmering
West Sussex

In Situ Infiltration Test Report

Report Beneficiary:
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1. INTRODUCTION

A drainage scheme is being designed for the proposed development at Pound Place, Roundstone Lane, Angmering, West Sussex.

A previous ground investigation, including in situ infiltrating testing carried out within trial pits and boreholes, was carried out at the site by Ashdown Site Investigation Ltd. The findings of the investigation were provided within the Combined Geotechnical and Ground Contamination Risk Assessment Report[1]. Within the western part of the site access was available for a mechanical excavator and water tanker to carry out large scale infiltration testing in general accordance with BRE365 Soakaway Design guidance. However, due to access restrictions for large plant to the east of the site, a shallow hand dug trial pit soakage testing was carried out instead, supplemented with borehole falling head infiltration testing.

The Local Authority has raised some queries relating to the testing carried out within the eastern part of the site and suggested further testing should be undertaken. Ashdown Site Investigation Ltd was requested to undertake additional large-scale trial pit soakage testing within the eastern part of the site, once suitable access had been created, to provide additional information to be resubmitted to the Local Authority as part of the planning application.

The specific objectives of the additional works were to:
a) Investigate the shallow ground and groundwater conditions at the additional test location;
b) Undertake infiltration testing within the test pits; and
c) Provide calculated soil infiltration rates to assist others in undertaking design of soakaways.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q9232, dated 17th December 2019. The instruction to proceed was received from the client, Savista Developments Ltd. The works were undertaken under purchase order ref: ANG-SAV-14.

[1] Ashdown Site Investigation Report No. R18-12844, dated April 2018.

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2. SITE CONTEXT

2.1 Site Details

The site comprises a roughly rectangular shaped plot of land located at Roundstone Lane, Angmering, Littlehampton, and is centred on the approximate Ordnance Survey national grid reference TQ 0751 0399. A site plan, showing the eastern part of the site, is presented as Figure 1.

2.2 Geological and Hydrogeological Information

2.2.1 Expected Geology and Aquifer Designation

The stratigraphic succession that may be expected to underlie the site is presented in the following table.

Table 1. Expected Strata and Aquifer Designation

Type	Stratum	Aquifer Designation
Superficial	River Terrace Deposits (undifferentiated)	Secondary A Aquifer
Bedrock	White Chalk Subgroup	Principal Aquifer

The River Terrace Deposits in this area were formerly denoted as the Brickearth and comprise brown sandy (fine) silt or clay largely originating from the solution weathering of the previously existing chalk. The material will have been reworked by water flow to produce some lateral variability in the grain size of the soil (sand and gravel) and can be expected to contain a variable content of flint.

The White Chalk Subgroup comprises a weak, white chalk locally with flint bands together with scattered nodular flints. It may be expected to have a deeply convoluted upper surface as a result of solution weathering. The presence of natural cavities in the chalk is very rare and solution features, if present, can be expected to be infilled with Quaternary deposits such as the River Terrace Deposits. The infill material may be significantly weaker than the surrounding chalk. Solution features can comprise pipes extending to several metres deep into the chalk or conical depressions and basin shaped structures.

2.2.2 Groundwater Source Protection Zones

The site does not lie within an Environment Agency Source Protection Zone with regard to the protection of the quality of groundwater that is abstracted for potable supply.

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3. SITE WORKS

The site works comprised the excavation of a single mechanically dug trial pit (denoted ST2) to a depth of 2.50m below ground level. On completion of excavation, in order to maintain stability during the soakage testing period, the trial pit was backfilled with free draining material together with a standpipe to monitor the drop in water levels. The trial pit was then subsequently filled with approximately 1000 litres for each soakage test. The fieldwork was carried out between 17th and 20th January 2019. The exploratory hole location is shown on Figure 1.

Descriptions of the strata encountered and comments on groundwater conditions are shown in the exploratory hole record given in the appendices together with notes to assist in its interpretation.

4. GROUND CONDITIONS

The ground conditions are similar to those encountered during the previous ground investigation.

4.1 Stratigraphy

4.1.1 Surface Covering

The trial pit was excavated through a surface cover of topsoil some 500mm in thickness.

4.1.2 River Terrace Deposits

Underlying the surfacing, the trial pit progressed into undisturbed silty clay deposits which were recorded to a depth of 1.70m below ground level. Beneath the clay soils, sandy clayey gravel was encountered persisting to the full depth of the trial pit at 2.50m below ground level.

These soils are considered to represent the River Terrace Deposits indicated on the published geological map.

4.2 Groundwater Conditions and Stability

The trial pit was recorded to be dry and stable during the course of excavation.

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5. STORMWATER INFILTRATION SYSTEMS

In-situ infiltration testing[2] was undertaken in trial pit ST2. The test pit was dug to a depth of 2.50m below ground level and was some 1.00m wide and 2.30m long. The pit was backfilled with free draining material to maintain stability during the test period.

For each of the three tests some 1000 litres of water was introduced into the pit within approximately 15-20 minutes. Due to the fast rate of discharge through the soils, the water level within the pit could not be raised above the base of the pit with the volume of water introduced, and as such calculation of the soil infiltration rates in strict accordance with the method prescribed by the BRE guidance document was not possible.

Assuming a void ratio of 25%, the maximum depth of water that a 1000L fill could induce within the pit would be some 1.74m. The maximum effective area of the surface of the pit (50% of the area of the soaked sides and its full base) would be 8.0m^2. Therefore, assuming a volume of water of 1000 litres and a 20-minute test period the lower bound infiltration rate would be approximately 1.04 x 10^{-4}m/s. However, given that water was not raised above the base of the pit, the base area of the pit could be assumed as the only drained area and therefore an infiltration rate in the region of at least 3.6 x 10^{-4}m/s may be applicable.

It is noted that the above infiltration rates are limited due to the volume of water that could be introduced into the trial pit and as such are likely to be conservative. A higher infiltration rate is likely to be calculated if larger volumes of water can be introduced into the trial pit in a shorter time period.

The results from the infiltration tests indicate that the coarse-grained soils of the River Terrace Deposits possess good infiltration characteristics. The results from the infiltration tests should be provided to engineers responsible for the design of the drainage system.

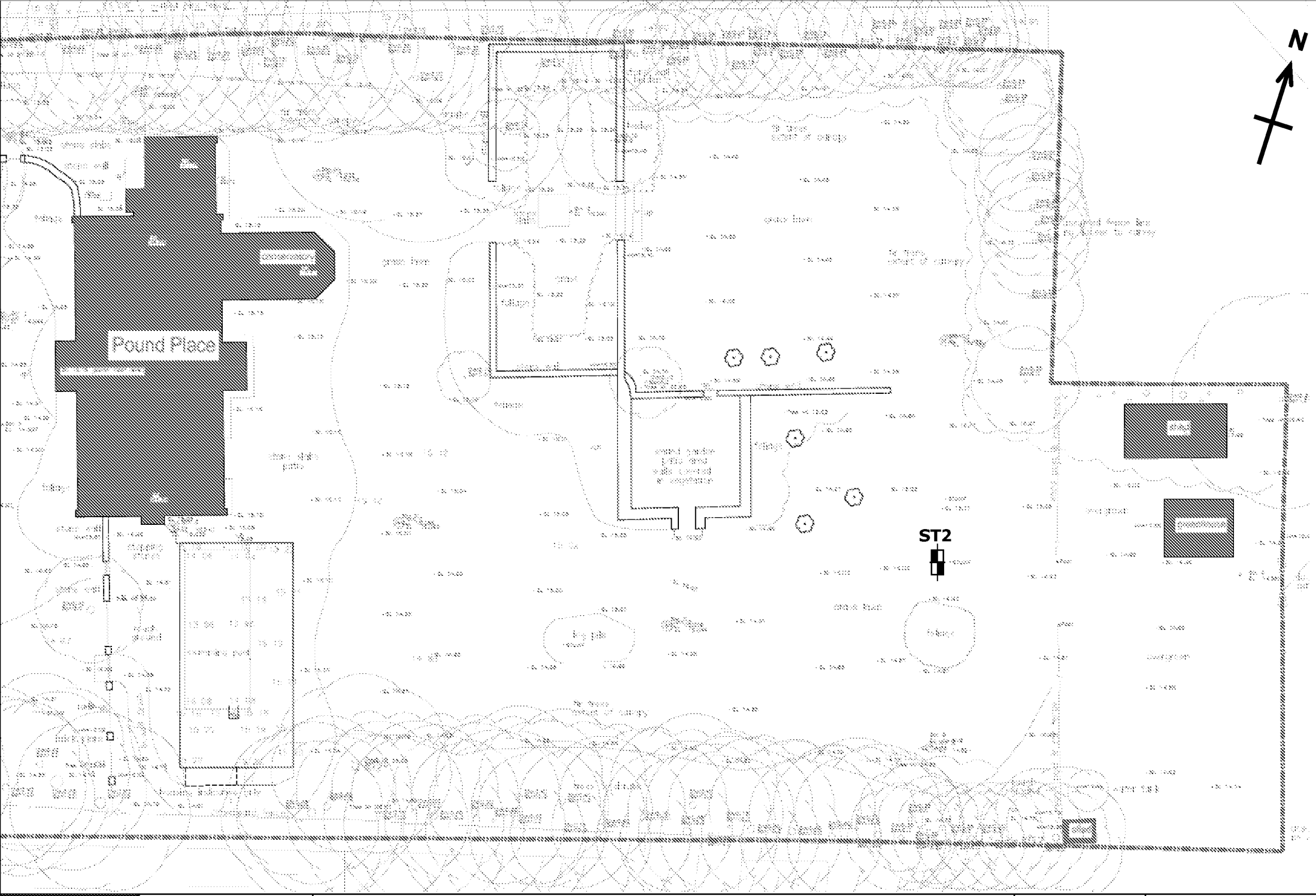
Ashdown Site Investigation Ltd.

[2] Conducted in general accordance with the requirements of BRE 365, Soakaway Design.

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FIGURES AND APPENDICES

Figure 1 Site Plan
Exploratory Hole Notes
Exploratory Hole Record



ASHDOWN SITE INVESTIGATION LIMITED	Site Plan	Site Name	Figure No.	Project Reference
0/DOC		Pound Place, Roundstone Lane, Angmering, West Sussex	1	P14370

NOTES FOR THE INTERPRETATION OF EXPLORATORY HOLE RECORDS

1 Symbols and abbreviations

Samples

U	'Undisturbed' Sample: - 100mm diameter by 450mm long. The number of blows to drive in the sampling tube is shown after the test index letter in the SPT column.
U_o	Sample not obtained
U*	Full penetration of sample not obtained
Pi	Piston Sample: 'Undisturbed' sample 100mm diameter by 600mm long.
D	Disturbed Sample
R	Root Sample
B	Bulk Disturbed Sample
W	Water Sample
J	Jar Sample (sample taken in amber glass jar fitted with gas tight lid)
T	Tub Sample
Vi	Vial Sample

In situ Testing

S Standard penetration test (SPT): Using the split spoon sampler.

C Standard Penetration Test (SPT): using a solid cone instead of the sampler - conducted usually in coarse grained soils or weak rocks.

V Shear Vane Test: Undrained shear strength (cohesion) (kN/m^2) shown within the Vane/Pen Test and N Value column.

H Hand penetrometer Test: Undrained shear strength (cohesion) (kN/m^2) shown within the Vane/Pen Test and N Value column.

P Perth Penetrometer Test: Number of blows for 300mm penetration shown under Vane/Pen Test and N Value column.

Excavation Method

CP	Cable Percussion Borehole
WLS	Dynamic Sampler Borehole using windowless sampler tubes
WS	Dynamic Sampler Borehole using window sampler tubes
TP	Trial Pit excavated using mechanic excavator
HDP	Trial Pit excavated using hand tools

2 Soil Description

Description and classification of soils has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of soil, Part 1 Identification and description (BS EN ISO 14688-1) and Part 2 Principles of classification (BS EN 14688-2) as well as the BS5930 code of Practice for Ground Investigations.

3 Rock Description

Description and classification of rocks has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of rock, Part 1 Identification and classification (BS EN ISO 14689-1) as well as the BS5930 code of Practice for Ground Investigations. TCR – Total Core Recovery, SCR – Solid Core Recovery, RQD – Rock Quality Designation, NI – Non Intact, If – indicative fracture spacing (min/ave/max), FI – Fracture Index.

4 Chalk Description

Chalk description is based on BS EN ISO 14688, BS EN ISO 14689 and BS5930. The classification of chalk generally follows the guidance offered by the Construction Industry Research and Information Association (CIRIA) C574, 'Engineering in Chalk'. This is based on assessment of chalk density, discontinuity and aperture spacing, and the proportion of intact chalk to silt of chalk.

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Site Name: Pound place, Roundstone Lane, Angmering, West Sussex

Job Number: P14370

Start Date: 18/01/2020

End Date: 20/01/2020

Trial Pit Number: **ST2**

Samples and In Situ Testing				Legend	Depth/ Reduced Level	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result			
					0.00	Topsoil.
					0.50	Brown slightly sandy silty CLAY. Sand is fine to coarse. (River Terrace Deposits)
D	0.60					
D	1.00					
D	1.50					
					1.70	Brown sandy clayey subangular to subrounded fine to coarse GRAVEL of flint. (River Terrace Deposits)
D	2.00					
D	2.50				2.50	End of trial pit at 2.50m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: Trial pit backfilled with free draining materials to support pit sides during testing.

Excavation Method:	TP
Pit Length:	2.30m
Pit Width:	1.00m
Made By:	BA